REMARKS

A separate sheet showing the amendments captioned "Marked-up Version Showing Changes" is submitted herewith.

The Examiner's conditional allowance of claims 12 and 14 is noted with appreciation.

The applicants have added new claim 24, which includes all the features of former claim 14, including the features defined in the base claims. Claim 14 is therefore believed allowable.

The objection with regard to claim 8 under 35 USC 112 is not understood. A driver circuit is a term recognized by persons skilled in the art in the context of this invention. Optical components are supplied with current to activate them by "driver circuits". Claim 8 adds to claim 1 the fact that the components include a driver circuit for the optical component. A circuit could perform any function. A driver circuit performs a specific function.

Claim 1 has been amended to specify that an array of positioning pads precisely located relative to the contacts is provided on the rear face of the substrate and that matching pads are provided on the guide frame. The guide frame is then floated into position on molten solder. Because the positioning pads are precisely located relative to the contacts, the guide frame, which is used to position the external light guide, is precisely aligned with the contacts, and hence the optical component. Support for this feature is found in the paragraph beginning at line 6, page 6 of the specification.

In the applicant's respectful submission, Spath clearly neither teaches nor suggests the formation of matching pads respectively on both the substrate and the guide frame, and the subsequent use of a float solder technique to align the guide frame with contacts and hence ultimately with the optical component. Moreover, critical alignment of Spath's guide frame is not important because in Spath the light merely exits into free space through the lens and

extremely precise positioning of the optical component is not required. On the contrary, the present invention is designed to be coupled to a light guide, typically an optical fiber, and in this case extremely precise positioning of the guide frame is required.

In order to establish a prima facie case of obviousness under 35 USC 103(a) "the prior art reference (or references when combined) must teach all the claim limitations". See MPEP 2143. (Emphasis added)

In the applicant's respectful submission, the prior art is silent about the precise positioning of the guide frame, and more particularly the method by which this is achieved as defined in the independent claims. Without having the matching pads on the substrate and the guide frame, a feature that is clearly not suggested in Spath, it will not be possible to achieve the degree of precision required for the invention. It is therefore respectfully submitted that in claims 1 and 16, and the claims dependent thereon, are now allowable in addition to new claim 24, which corresponds to former claim 14.

Reconsideration and allowance are therefore courteously solicited.

Respectfully submitted,

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CERTIFICATE OF MAILING

I hereby certify that thecorrespondence herewith is being deposited with the United States Postal Service as first class mail in an envelope addressed to: GAU 2827, Commissioner for Patents, Washington, D.C. 20231 on **March 26, 2003**.

Shelly Hubbard

MARKED-UP VERSION SHOWING CHANGES

The application has been amended as follows:

1. (Amended) A method of making an active optical device for coupling to an external light guide, comprising the steps of:

providing a substrate with a light path therethrough and having a front face and a rear face;

providing a plurality of components for attachment to the rear face of said substrate, each said component having a face presenting an array of contacts, said components including at least one active optical component selected from the group consisting of a light emitter and light receiver;

forming a plurality of arrays of contacts on the rear face of said transparent substrate at precisely defined locations corresponding to an intended location of the contacts of each component;

forming arrays of positioning pads on said rear face of said transparent substrate at precisely defined locations relative to said plurality of arrays of contacts;

providing a guide frame for locating the external light guide and having guide frame pads precisely matching said arrays of positioning pads;

attaching said guide frame to said rear face of said substrate in a precise location determined by said positioning pads by soldering said guide frame pads to said arrays of positioning pads and floating said guide frame into place on molten solder; and

flip-chip bonding said components onto said substrate ~~using a solder alignment technique to attach said components to said substrate~~ in precisely predetermined locations determined by

said arrays of contacts by floating said components into said precisely determined locations on molten solder; and

wherein said at least one optical component ~~being~~ is oriented so that it can be optically coupled through said substrate to the external light guide.

5. (Amended) A method as claimed in claim 41, wherein said positioning pads comprise solder bumps for use in the solder alignment of said guide frame to said substrate.

6. (Amended) A method as claimed in claim 41, wherein said positioning pads are arranged in opposed pairs extending on either side of a line.

7. (Amended) A method as claimed in claim 41, wherein said arrays of contacts on said substrate comprise solder bumps for use in the solder alignment of said components to said substrate.

12. (Amended) A method as claimed in claim 41, wherein said guide frame is made of nickel.

16. (Amended) A method of making an active optical device for coupling to optical fibers, comprising the steps of:

providing a transparent substrate having a front face and a rear face;

providing a plurality of active components for attachment to the rear face of said

substrate, each said active component having face presenting an array of contacts, said components including at least one optical component selected from the group consisting of a light emitter and light receiver;

forming a plurality of arrays of solder bumps on the rear face of said transparent substrate at precisely defined locations corresponding to an intended location of the contacts of each component;

providing a guide frame having at least one array of shaped pads;

forming at least one array of solder pads on the rear face of said substrate at precise locations for locating a guide frame, said solder pads being matched to said shaped pads of said guide frame;

flip-chip bonding said components onto the rear face of said substrate using a solder alignment technique to attach said components to said substrate in precisely predetermined locations determined by said arrays of solder bumps;

said at least one optical component being oriented so that it can be optically coupled through said transparent substrate to an external light guide on the front face thereof; and

bonding said guide frame to said substrate using a solder alignment technique to locate said guide frame in a precise position by aligning said shaped pads with said solder pads, said guide frame including indicia marking the location of guide pins for said external light guide.

24. (New) A method of making an active optical device for coupling to an external light guide, comprising the steps of:

providing a substrate with a light path therethrough and having a front face and a rear face;

providing a plurality of components for attachment to the rear face of said substrate, each

said component having a face presenting an array of contacts, said components including at least one active optical component selected from the group consisting of a light emitter and light receiver;

forming a plurality of arrays of contacts on the rear face of said transparent substrate at precisely defined locations corresponding to an intended location of the contacts of each component;

flip-chip bonding said components onto said substrate using a solder alignment technique to attach said components to said substrate in precisely predetermined locations determined by said arrays of contacts, said at least one optical component being oriented so that it can be optically coupled through said substrate to the external light guide;

bonding a heat sink on said substrate over said components and said guide frame, said heat sink including on a front side thereof facing the rear face of said substrate protruding guide pins for aligning said substrate with said external light guide, said guide pins being aligned with the aid of said guide frame; and

wherein said guide frame contains holes located to permit said guide pins to pass through, said holes being located in wing portions of said guide frame extending beyond side edges of said substrate.